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MEMORANDUM

TO: Patrick Goddard, Director of Facilities, Town of Lexington
Paul B. Ash, Ph.D., Superintendent, Lexington Public Schools, Estabrook Advisory Committee

FROM: Matt A. Fragala, M.S., C.I.H., Senior Scientist

DATE: December 17, 2010

RE: Air Samples Collected on November 24, 2010, Estabrook Elementary School (EH&E 17228)

This memorandum provides results of the most recent air sampling at Estabrook Elementary School (Estabrook). The objective of the air testing was to measure levels of polychlorinated biphenyls (PCBs) in indoor air of classrooms that have been mitigated according to the interim measures planned at this time for the entire school.

AIR SAMPLE RESULTS

Interim measures had been completed in a majority of the school by November 21, 2010. Following completion, air samples were collected in rooms 7A, 7B, 26, 27, the library, teacher work area, and an administration office from approximately 12:30 p.m. – 6:00 p.m. on Wednesday November 24, 2010. Details of the interim measures and other aspects of the current indoor environmental quality (IEQ) management plan are available in the Project Update memorandum dated October 28, 2010, and the materials distributed to the Superintendent's Advisory Committee on November 4, 2010. In brief, a mini-wall was constructed in each room to encapsulate the lower panels of the curtain wall. The mini-wall separates the panels and associated PCB-containing materials from indoor air of the classroom. In addition, I-beam chases were enclosed and specific areas related to the curtain wall were sealed with new caulk or foam insulation. Areas sealed included edges of the mini-wall, metal-to-metal joints of aluminum framing, and original caulking at the intersection of horizontal and vertical aluminum frames.

Operating conditions for heating and ventilation during the air testing were standard for winter conditions, in accordance with the current IEQ management plan. The thermostat in each room was set to 70 degrees Fahrenheit (°F).

As shown in Table 1, PCB concentrations in indoor air of the rooms tested ranged from less than 5.3 nanograms per cubic meter (ng m^{-3}) to 135 ng m^{-3} . These PCB concentrations are within the most conservative annual average levels for all ages suggested by the site-specific assessment (230 ng m^{-3}). In addition, these concentrations are well below the public health levels for annual average concentrations suggested by the U.S. Environmental Protection Agency (EPA) for children older than 6 years (300 ng m^{-3}) and adults (450 ng m^{-3}). Rooms 7A, 7B, 26, 27, the teacher work area and the administration office tested were less than the EPA's suggested annual average levels for children less than 6 years old (100 ng m^{-3}).

One additional round of testing was conducted at Estabrook on December 2, 2010. These samples are currently being analyzed with results due to arrive on December 20, 2010.

Table 1 Air Sample Results for Total Polychlorinated Biphenyls, Estabrook Elementary School, 117 Grove Street, Lexington, Massachusetts, July 22, 2010 – November 24, 2010*

Sample Location	Total PCBs (ng/m ³)										
	Round 1 ^a	Round 2 ^b	Round 3 ^c	Round 4 ^d	Round 5 ^e	Round 6 ^f	Round 7 ^g	Round 8 ^h	Round 9 ⁱ	Round 10 ^j	Round 11 ^k
Room 1	299	426	118 [†]	63 [†]	76 [†]	153 [†]	145	–	116	–	–
Room 2	–	775	455	189	166	253 [†]	53	–	60	–	–
Room 3	–	–	–	–	–	364 [†]	111	–	110	–	–
Room 4	–	–	–	–	–	344 [†]	126	105	–	–	–
Room 5	459	736	320	196	149	209 [†]	67 – 90	–	128	–	–
Room 6	1,800	764	483	171	213	383 [†]	182	118 – 144	–	–	–
Room 7A	–	–	5.19	–	–	–	–	–	–	–	34
Room 7B	–	–	–	–	–	–	–	–	–	–	<5.3
Room 11	–	–	–	–	–	–	–	–	65	–	–
Room 13	319	340	184	155 [†]	–	–	–	–	89 – 94	–	–
Room 19	–	–	–	–	–	–	–	–	12	–	–
Room 20	–	–	–	–	–	–	–	–	–	57	–
Room 21A	–	–	410	193	–	–	–	–	–	–	–
Room 21B	–	–	–	–	–	–	–	–	–	188	–
Room 22	–	–	–	–	–	–	–	–	–	25	–
Room 23	–	–	–	–	–	–	–	–	–	142	–
Room 24	680	601	226	173 [†]	–	–	–	–	–	105 – 107	–
Room 25	–	–	–	–	–	–	–	–	–	130	–
Room 26	–	–	–	79	–	–	–	–	–	–	47
Room 27	–	–	–	–	–	–	–	–	–	–	69
Room 31A	562	575	444	–	–	282	–	–	–	94	–
Room 31B	–	–	–	–	–	–	–	–	–	135	–
Room 39B	–	419	–	–	–	–	–	–	–	64	–
Room 39C	342	495	245	100	–	–	–	–	–	125	–
Library	–	469	196	–	–	–	–	–	–	–	135
Art Room	–	–	194	–	–	–	–	–	–	–	–
Teacher Work Room	–	–	138	–	–	–	–	–	–	–	34
Admin. Offices	–	–	–	–	–	–	–	–	–	–	72

Table 1 Continued

Sample Location	Total PCBs (ng/m ³)										
	Round 1 ^a	Round 2 ^b	Round 3 ^c	Round 4 ^d	Round 5 ^e	Round 6 ^f	Round 7 ^g	Round 8 ^h	Round 9 ⁱ	Round 10 ^j	Round 11 ^k
Teacher Lounge	—	—	—	—	—	—	—	—	—	89	—
Basement	—	—	227	—	—	—	—	—	—	—	—
Ceiling plenum (39C)	—	—	562	—	—	—	—	—	—	—	—
Psychologist Office	—	—	—	—	—	253	—	—	—	—	—
Outdoors	<3.79	<5.00	<4.20	<4.46	<4.32	<4.44	<5.54	<4.58	<4.60	<4.08	<5.32

PCB polychlorinated biphenyl
ng/m³ nanograms per cubic meter
— air sample not collected at that location

^a Round 1 samples collected July 22, 2010, during summer conditions.

^b Round 2 samples collected on August 25, 26 or 27, 2010, following removal of caulk around exterior window frame.

^c Round 3 samples collected on September 6, 2010, following initial optimization of outdoor air delivery and central exhaust, unless otherwise noted.

^d Round 4 samples collected on September 19, 2010 under optimization of outdoor air delivery and central exhaust, and indoor caulk encapsulation, unless otherwise noted.

^e Round 5 samples collected on September 27, 2010 under optimization of outdoor air delivery and central exhaust, partial indoor caulk encapsulation, and isolation of ceiling tiles.

^f Round 6 samples collected on September 29, 2010 under reduced outdoor air delivery, central exhaust, full indoor caulk encapsulation, and isolation of ceiling tiles.

^g Round 7 samples collected on October 18 and 19, 2010 under isolation, encapsulation and air cleaner configurations.

^h Round 8 samples collected on November 4, 2010 under winter outdoor air delivery, mini-wall, and full indoor caulk encapsulation.

ⁱ Round 9 samples collected on November 11, 2010 under winter outdoor air delivery, mini-wall, and full indoor caulk encapsulation.

^j Round 10 samples collected on November 20, 2010 under winter outdoor air delivery, mini-wall, and full indoor caulk encapsulation.

^k Round 11 samples collected on November 24, 2010 under winter outdoor air delivery, mini-wall, and full indoor caulk encapsulation.

* PCB concentration analysis performed by Alpha Analytical Inc., using U.S. Environmental Protection Agency (EPA) Method 10A (GC/MS-SIM).

† Samples collected under minimum outdoor air delivery.

‡ Sample collected with supplemental air outdoor air (1200 CFM).

A graphical summary of the PCB concentration measured in indoor air of Estabrook between July 22 and November 24, 2010, is provided in Figure 1. Indoor air PCB levels measured during Round 11 were approximately 7-fold lower than in Round 1. Similarly, a 2-fold decrease in average concentrations has been achieved since winter ventilation conditions began in late September. These observations demonstrate the effectiveness of the mitigation methods employed in the school.

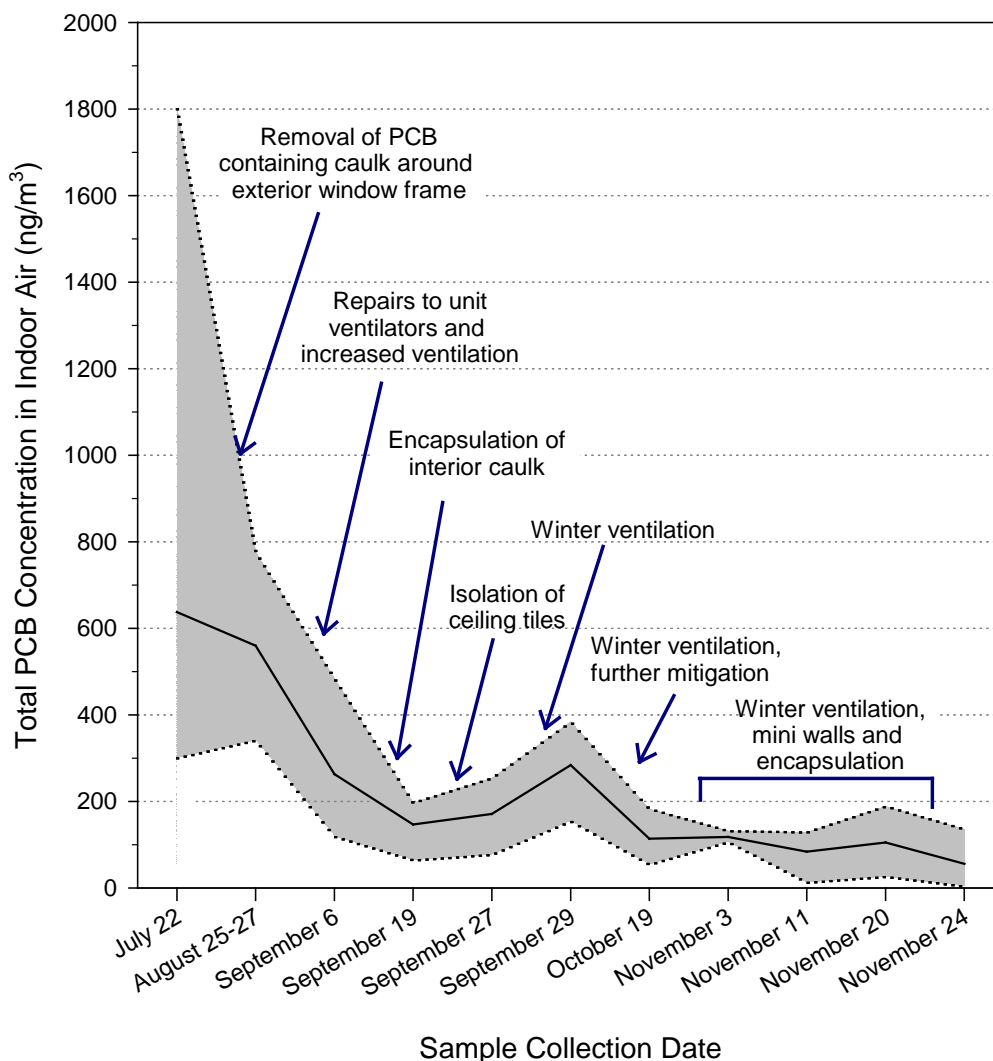


Figure 1 Average (line) and Range (shaded area) of Total PCB Concentration in Indoor Air over Time

If you have any questions regarding this memorandum please do not hesitate to us at 1-800-TALK EHE (1-800-825-5343).